Form ESA-B4. Summary Report for ESA-224-3
Public Report – Final

Company	Boise Paper	**ESA Dates**	November 19-21, 2008
Plant	Jackson, AL	**ESA Type**	Paper Machines
Product	Fine Paper	**ESA Specialist**	Dick Reese

Brief Narrative Summary Report for the Energy Savings Assessment:

Introduction:

Dick Reese of Dick Reese and Associates, Inc. conducted a paper machine energy evaluation at Boise Paper in Jackson, Alabama November 19 to 21, 2008. The evaluation was sponsored by the United States Department of Energy (DOE) Save Energy Now initiative.

Steam is generated by burning black liquor, bark, #2 fuel oil, #6 fuel oil, and natural gas. Natural gas is the incremental fuel.

Total annual electricity consumption is 497,640 MW. Purchased electricity is 74% of total consumption.

Objective of ESA:

The objective of the assessment was to identify opportunities to reduce energy consumption on the paper machines.

Focus of Assessment:

The evaluation was focused on energy reduction projects that could be implemented with no capital cost or would have a payback period of less than two years.

Approach for ESA:

Paper machine energy scorecards were completed and discussed with mill personnel for the two paper machines to identify energy strengths, limitations, and opportunities to reduce energy consumption. Walking tours of the paper machines were made to identify other opportunities for reducing energy consumption. An exit meeting was held to discuss scorecard results, energy performance indices, and opportunities to reduce energy consumption.

General Observations of Potential Opportunities:

a. Near term opportunities include actions that could be taken as improvements in operating practices, maintenance of equipment or relatively low cost actions or equipment purchases.
b. Medium term opportunities require purchase of additional equipment and/or changes in the system such as installation of heat recovery equipment or equipment to permit reduction. It would be necessary to carryout further engineering and return on investment analysis.
c. Long term opportunities would require testing of new technology and confirmation of performance of these technologies under the plant operating conditions with economic justification to meet the corporate investment criteria.

    1. Shut off steam to bottom unorun dryers #11 on J-1-Bottom unorun dryers do not contact the sheet so little or no drying occurs and steam blow through rates are very high. Other bottom unorun dryers are not heated on J-1 and dryer number 11 is in the third steam and condensate system. Estimated steam savings is 1,000 lb/hr. High blow through steam flows also causes erosion of steam joints and condensate piping.

2. Shut off dry end pulper agitators when the sheet is on J-3 reel-J-3 dry end pulper has two agitators each with 400 connected horsepower. Both agitators were operating during the mill visit when the sheet was on the reel and broke was not being fed to the pulper. The DCS indicated that each agitator was pulling 34% of full amp load. Annual cost per operating horsepower is approximately $400.
3. Conduct trials with lower whitewater heating on J-3-Reported average steam use for heating whitewater on J-3 is 20,000 lb/hr during summer months and 35,000 lb/hr during winter months. This equates to annual steam cost of $3 million. It appears that steam consumption for heating whitewater could be reduced by reducing heating of excess whitewater and lowering wire pit temperature.
4. Modify DCS to provide managed differential pressure control of dryers on both paper machines-Both machines vent steam during web breaks. Managed differential pressure control eliminates steam venting during breaks and reduces use of motive steam. MDPC can be implemented with existing equipment and control systems. Cost of implementing MDPC is approximately $20,000 per machine. Payback period is typically six to nine months.
5. Conduct trials to increase starch solids on both machines-Reported starch solids are 4.5-6.0% on J-1 and 10.5-11.0% on J-3. Starch type, viscosity, metering size press rods, and other factors have to be considered. Some competitive machines are running much higher starch solids. Increasing starch solids to 8% on J-1 would reduce after-size dryer steam consumption by over 25%. Increasing starch solids to 15% on J-3 would reduce after-size dryer steam consumption by over 30%.
6. Recover heat from paper mill effluent- The difference in average annual temperatures between incoming water to the paper mill and effluent is 40^{o} F. This indicates that approximately $8 million worth of steam is being used to heat water. Installation of a heat exchanger to transfer heat from the effluent to incoming fresh water is recommended. It is estimated that 50% of the heat lost could be recovered. Pre-heating fresh water may cause some issues with vacuum pump seal water temperature and other cooling water flows so cooling water requirements need to be considered.
7. Develop balances of J-1 paper machine water systems-Reported water use on J-1 is more than four times the good performance target. J-1 and J-3 have a common excess whitewater tank and J-1 whitewater is sewered when colored paper grades are produced. Water balances need to be developed on white and colored paper grades to identify opportunities to reduce water consumption. Use of clarified whitewater is limited on J-1 because clarified whitewater quality is not good enough to avoid shower nozzle plugging. Installation of filtration equipment such as gravity strainers and canister filters may permit greater use of clarified whitewater.
8. Conduct a detailed press section optimization program on J-3-Paper machine performance and sheet dewatering reportedly go down at the end of press fabric life. There are issues with some press fabrics, press fabric conditioning, and other parameters. Press section optimization should increase sheet exit dryness by at least one percentage point which would reduce dryer section steam consumption by approximately 4%. TAPPI TIP 0404-52, press section optimization provides guidelines for improving press section performance. Press section clothing, roll cover, and shower nozzle suppliers can provide assistance.

Management Support and Comments:

Mill personnel expressed satisfaction at the exit meeting for the evaluation and the recommendations to reduce energy consumption.

DOE Contact at Plant/Company:

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